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Indian Explosives Act (IV of 1884)

Indian Petroleum Act (VIII of 1899)

THIRTY-FIRST ANNUAL REPORT

OF THE

**Chief Inspector of Explosives
in India**

Being his Annual Report for the year ending 31st March 1930.



**CALCUTTA: GOVERNMENT OF INDIA
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N. B. Mathur, Supdt., Nazir Kamm Hind Press, Allahabad.
The North India Christian Tract and Book Society, 18, Clive Road, Allahabad.
Ram Dayal Agarwala, 184, Katra, Allahabad.
Rao Naran Lal, Katra, Allahabad.
The Indian Army Book Depôt, Dayalbagh, Agra.
Narayan & Co., Weston Road, Oaypore.
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Manager, Newal Kishore Press, Lucknow.
The Upper India Publishing House, Ltd., Literature Palace, Aminuddaula Park, Lucknow.
Rai Sahib M. Gulab Singh & Sons, Mufid-i-Am Press, Lahore and Allahabad.
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The Standard Bookstall, Lahore.
The Proprietor, Punjab Sanskrit Book Depôt, Saidmitha Street, Lahore.
The Insurance Publicity Co., Ltd., Lahore.
The Punjab Religious Book Society, Lahore.
The Commercial Book Co., Lahore.
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Manager of the Imperial Book Depôt, 63, Chandni Chowk Street, Delhi.
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Oxford Book and Stationery Company, Delhi, Lahore, Simla, Meerut and Calcutta.
Supdt., American Baptist Mission Press, Rangoon.
The Modern Publishing House, Ltd., 30, Phayre Street, Rangoon.
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AGENT IN PALESTINE :—Stelmatzky, Jerusalem;

Thirty-first Annual Report of the Chief Inspector of Explosives in India.

No. G-52.

From

DR. N. L. SHELDON, PH.D., F.I.C.,

Chief Inspector of Explosives in India,

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
DEPARTMENT OF INDUSTRIES AND LABOUR,

SIMLA.

Calcutta, 16th September 1930.

Sir,

I have the honour to submit herewith a report of the work of the Department of Explosives during the year ending 31st March 1930.

2. I was granted leave out of India on average pay for 5 months and 9 days combined with leave on half average pay for 7 months and 22 days with effect from the afternoon of the 20th September 1928. Dr. W. P. Robson, M.A., Ph.D., A.I.C., officiated for me during my absence.

Mr. P. W. Alloway, F.C.S., Inspector of Explosives, Calcutta, has been granted leave out of India on average pay for seven months with effect from the afternoon of the 21st March 1930.

Explosives.

3. During the year 1929, 235 licenses were granted in British India under Rule 46 and items 10 and 11 of Schedule II to the Indian Explosives Rules, 1914. The number of magazines licensed was 278 or one more than in 1928, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines in one place under one license. A statement showing the number and location of the magazines and also the number of licenses granted in British India during the year 1929 is given in Appen-

dix A, and a statement showing the number of magazines and licenses granted during the past ten years is shown in Appendix B.

4. During the year, 231 inspections of magazines were made, a number of magazines being inspected two or three times. Those magazines are inspected most frequently which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives, or any explosive which on account of its greater susceptibility to decomposition and possible ignition, it is considered advisable to examine and test more frequently than other explosives.

Inspection of explosives magazines during the year. Condition of magazines. 5. The magazines generally are in good order, and as usual magazine-owners have been found most willing to carry out recommendations even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

6. The physical condition of all the explosives in the different magazines during the year was found to be good with the exception of 200 detonators stored in the magazine of the Consolidated Tin Mines of Burma Ltd. at Hermyingyi which were found to have become defective and were destroyed.

Thefts. 7. During the year under report two cases of theft of explosives were reported to this office. 8. Three thousand six hundred and eighty tons of explosives were imported into British India during the year 1929, the value being Rs. 39,62,689. Full details showing the different kinds of explosives imported, and the value of each are given in Appendix C. A comparative statement showing the quantity of explosives imported during the last 10 years is given in Appendix D.

9. A list of explosives at present authorised for importation into British India was published in the *Gazette of India* for information and is given in Appendix E.

Authorised explosives. 10. Two licenses granted by the Governor General in Council for the manufacture of gunpowder in the Central Provinces were renewed during the year.

Manufacture of explosives. Two licenses, viz., one for the manufacture of Liquid Oxygen Explosives in the whole of British India and the other for the manufacture of Praxela (M. and Q. Powder)—an explosive of the 2nd (Nitrate-mixture) class—at Bansa in the Burdwan District, for demonstration purposes were granted by the Governor General in Council under Article 10 of Schedule II to the Indian Explosives Rules, 1914, during the year.

Petroleum.

11. During the year under report, 5,248 licenses for the storage of dangerous and non-dangerous petroleum, regarding which this Department was concerned or consulted, were granted. A list of these premises, corrected up to 31st December 1929 and showing the districts in which they are located, is given in Appendix F.

Number of Petroleum Premises.

12. A large number of special licenses were granted under Rule 6, Chapter IV, Part II of the Rules for the storage of dangerous petroleum in underground tanks fitted with Kerbside pumps.

A large number of depots for the storage of dangerous petroleum in bulk erected to plans approved by this Department has been taken into use.

13. Applications for the erection of combined petrol, kerosene and liquid fuel installations for which no specific provision exists in the Petroleum Rules have been received and disposed of as far as possible in conformity with the Rules so as not to cause any hinderance to the trade.

Inspection of petroleum premises during the year.

14. In all 1969 inspections of petroleum premises were made.

15. The large petroleum installations are usually under efficient European supervision and are in good order and well looked after.

16. The small or minor petroleum installations are installations in which not more than 50,000 gallons of kerosene or liquid fuel in combined bulk and non-bulk are stored. The oil for these installations is supplied from the major installations at the different ports, and the retail trade is carried out in them. A great deal of inspection of these minor installations has been done by this Department with the result that their condition is very much improved and the vast majority of them are in very good order.

Accidents.

17. A list of accidents, with a short account of each, that have occurred with explosives, inflammable substances, dangerous goods, etc., between the 1st January and 31st December 1929 is given in Appendix G. It will be seen from a perusal of the details that practically all the accidents were caused by gross neglect of ordinary precautions. 41 such accidents resulting in 64 deaths and injuries to 52 persons were reported to this Department. Comparative statements given in Appendices I and J show the total number of accidents and the number of persons killed or injured by them during the last ten years. As stated in previous reports it is very doubtful whether all accidents that occur are duly reported to this Department and therefore, it is very possible that the statistics given are underestimated.

As a rule the only accidents that are entered in Appendix G are those which cause loss of life or injuries or are important from some other point of view.

Gunpowder, Class I.

18. There were six accidents from gunpowder during the year causing twenty-one deaths and injuries to four persons.

Nitro-Compounds, Class III.

19. There was one accident from nitro-compounds causing one death.

Chlorate Mixture, Class IV.

20. No accidents from explosives classed as Chlorate mixtures were reported.

Fulminates, Class V. 21. Two accidents from fulminates causing one death and injuries to one person were reported.

Ammunition, Class VI. 22. There was one accident from ammunition causing injuries to one person.

Fireworks, Class VII. 23. Six accidents from fireworks caused eleven deaths and injuries to thirteen persons.

Liquid Oxygen Explosives. 24. There was one accident from Liquid Oxygen Explosives which was responsible for three deaths.

25. There were twenty accidents from petroleum during the year, which were responsible for twenty-six deaths and injuries to twenty-eight persons. It will be seen from a perusal of the accidents in Appendix G that carelessness is a prominent feature in most of them. In India the petroleum accidents are caused usually by naked lights being brought into close proximity to oil vapour.

26. A number of fires were reported to this office as having occurred during the year in the Burma Oil Fields.

Chemicals. 27. No accident from chemicals was reported.

Miscellaneous. 28. There were four miscellaneous accidents causing one death and injuries to five persons.

29. A blasting powder factory at Khewra Salt Mine blew up on the 8th February 1929 and nine persons were killed. The cause of the explosion appeared to be the overheating of the spindle of a powder grinding mill. An enquiry into the cause of the explosion was made by Dr. W. P. Robson, M.A., Ph.D., A.I.C., Officiating Chief Inspector of Explosives at the request of the Government of the Punjab. His report No. G-4(178), dated 28th March 1929 is given in Appendix K.

30. On the 6th February 1929 four crude oil flats belonging to the British Burma Petroleum Company, Limited, caught fire at Thilawa resulting in the death of seven persons and injuries to one. An enquiry into the cause of the fire was made by Dr. W. P. Robson, M.A., Ph.D., A.I.C., Officiating Chief Inspector of Explosives at the request of the Government of Burma. His reports No. G-5(69), dated the 2nd March and 14th June 1929 are given in Appendix L.

31. On the 19th March 1929 an explosion took place at No. 4 Jetty Budge Budge as a result of which six men were injured. The fire was caused by "Heave-Up" boat with a fire burning in the stern coming into violent contact with a petroleum boat. An enquiry into the cause of the fire was made by Dr. W. P. Robson, M.A., Ph.D., A.I.C., Officiating Chief Inspector of Explosives at the request of the Chairman, the Commissioners for the Port of Calcutta. His report No. G-5(71), dated the 8th April 1929 is given in Appendix M.

32. On the 4th April 1929, a serious fire and explosion took place at Bench "C" of the Burmah Oil Company's refinery at Syriam, Burma. Seven men were killed and seven other injured. Dr. W. P. Robson, M.A., Ph.D., A.I.C., Officiating Chief Inspector of Explosives investigated the cause of the accident at the request of the Government of Burma. His reports

No. G-5(72), dated the 1st May and the 27th June 1929, respectively, are given in Appendix N.

33. During my visit to Rangoon in January last, I inspected several match factories with a view to suggest measures that should be adopted to minimise the risk of fires in such factories. My report No. G-7(36), dated 11th March 1930 to the Government of Burma is given in Appendix O.

General Remarks.

34. Twenty-one reports of inspection of these magazines by civil officers have been received in this office, and I have brought to the notice of the officers concerned any irregularities or defects which required remedying. There is no doubt that the introduction of this system of sending these reports to this office has been desirable. I have come across a good many instances of ignorance and want of expert knowledge, which might have caused disasters. High explosives in these magazines had previously never been tested, and I have, in dealing with these reports, recommended always that samples of these explosives should be sent at least once a year to Chemical Examiners for test.

35. At the request of the Chief Engineer, Punjab, Public Works Department, Hydro-Electric Branch, Lahore, four explosives magazines of that Department situated at different parts of the Hydro-Electric Works at Jogindanagar in Mandi State were inspected by the Inspector of Explosives, North-East Circle, on the 8th July 1929 with a view to examine the stock of gelignite stored therein for the last 2½ years as the Hydro-Electric Works had had during tunnelling operations a number of misfires culminating in an accident resulting in the death of three men and the Chief Engineer was anxious to know "whether this inertness of gelignite may not be accompanied by chemical changes which might result in spontaneous combustion and at any rate therefore might make its storage, use or employment dangerous." None of these magazines had been built and were being maintained strictly on the lines usually recommended by this Department and it was suggested that a properly constructed central magazine should be constructed. These magazines were inspected again on the 4th and 5th December 1929. A site for a new magazine has been chosen and the work will be put in hand shortly.

36. The Salt Range magazines at Khowra, Warcha and Kala Bagh were inspected by this Department during the year.

37. Three Railway magazines were inspected by this Department during the year.

38. This Department has agreed to the importation of detonators into British India by the Agents of Messrs. Nobel's Explosives Company, Limited, packed in cases with a clear space of not less than one inch, instead of not less than three inches as required by the regulations for package of explosives given in Schedule IV to the Indian Explosives Rules, 1914, between the inner and outer packages for a period of one year from the 23rd November 1929 as an experimental measure, subject to certain conditions:

Packing of Detonators.

39. This Department agreed to the importation of a small consignment of "Rockite" into British India for trial. It was decided after experiment that the explosive should be used in this country. It has now been included in the List of Authorised Explosives.

40. In reply to an enquiry relating to the discharge of Cordeau Bickford in Docks, I have stated that it should be handled in the same way as safety cartridges and safety fuse.

41. With reference to an enquiry I have advised the Postal Department that Sparklers come within the definition of Manufactured Fireworks, Class VII, Division II, and as such they come within the meaning of Section 19 of the Indian Post Office Act (Act VI of 1898).

42. At the request of the Locomotive and Carriage Superintendent, Eastern Bengal Railway, this Department inspected a wagon of the new design of standard wagon for the carriage of explosives on Indian Meter Gauge Railways at Saidpur and approved of the design.

43. In reply to an enquiry I have advised the Postal Department that Magnesium wire or ribbon is not to be treated as an inflammable substance for postal purposes.

44. At my suggestion the Government of India have sanctioned an amendment of certain forms of the Petroleum Rules so as to reduce the air space required to be left in receptacles holding petroleum from 10 per cent. to 5 per cent.

The Government of Bombay in their Notification No. 441, dated the 25th July 1929, have amended rule 16 of Part III of the Rules for the importation, possession and transport of petroleum in the Bombay Presidency so as to enable any vessel carrying petroleum in bulk for discharge partly at the port of Bombay and partly at another port to proceed to the special berth allotted for the purpose of discharge of petroleum in bulk at Bombay without first having temporarily discharged the petroleum for the other port provided the tanks containing dangerous petroleum for the other port are not disturbed for any purpose whatsoever. The above rule under the Government of Bombay Notification No. 6798, dated the 16th April 1930 has been amended further so as to allow any vessel having non-dangerous petroleum in cases and general cargo on board to proceed to a wharf berth for the discharge of her general cargo subject to certain conditions.

The Government of Bombay in their Notification No. 6810, dated the 25th March 1930 have amended rule 14 of Part III of the Rules for the importation, possession and transport of petroleum in the Bombay Presidency so as to remove the restriction regarding the quantity of certificated petroleum which may be discharged at the usual anchorage in the port of Aden.

The Agent to the Governor-General in Rajputana and the Agent to the Governor-General in Central India in Notifications No. 204-Pol.—29, dated the 27th May 1929 and No. 2494-B., dated the 23rd October 1929 have issued rules to regulate the possession and transport of petroleum in Railway Lands in Rajputana and Central India respectively.

45. The Government of Bombay in their Resolution No. 6774, dated the 8th February 1930 have issued revised rules for the transport of petrol in country craft between Bombay and other Ports in the Presidency.

46. The Government of the United Provinces in their letter No. 2187—XVIII-11, dated 30th November 1929, have authorised the town area committees in the Province to grant licenses, in accordance with the Petroleum Rules, for the possession and transport within town area limits of non-dangerous petroleum not in bulk.

47. On a reference from the Burmah Shell Oil Storage and Distributing Company of India, Limited, Calcutta, this Department agreed to the installation of an underroof of "Celotex" as an experiment in filling sheds of the Company's one or two upcountry bulk petrol depots subject to certain conditions.

48. A very large number of enquiries of a varied nature was received during the year from District Officials, private individuals, firms, Port authorities and Railways. These were all dealt with.

49. I was consulted by the Indian Railway Conference Association in connection with numerous amendments and additions to the rules contained in the Red Pamphlet No. 9 (Rules and Rates for the conveyance of explosives and other Dangerous Goods by Rail). A new Red Pamphlet No. 10 has recently been issued.

50. The number of Inspections done by this Department during the year was 2,218. To give some idea of the work and the ground covered, I give the following details of the work done by the Inspectors of Explosives.

During the 12 months, 1st April 1929 to 31st March 1930, the two Inspectors at Calcutta and Poona were away from their head-quarters for 268 and 197 days and travelled 36,974 and 39,940 miles respectively.

The Chief Inspector and the Officiating Chief Inspector of Explosives were on tour for 99 days, travelled 31,297 miles, and inspected 57 explosives magazines and 433 petroleum premises, and went on inspection duty to the Burma Oil Fields and visited the ports of Calcutta, Madras, Bombay, Rangoon and Chittagong.

The ordinary inspection work of both the Chief Inspector and the Officiating Chief Inspector of Explosives has been considerably interfered with during the year under review owing to the number of times that they have been called away, or summoned to appear in Court, in connection with criminal and other cases.

51. This office is now permanently located in Calcutta at No. 1, Council House Street.

I have the honour to be,

SIR,

Your most obedient Servant,

N. L. SHELDON,

Chief Inspector of Explosives in India.

APPENDIX A.

List of Magazines and Licenses granted under Rule 46 and items 10 and 11 of Schedule II of the Indian Explosives Rules, 1914, for the year 1929.

Presidency or Province.	District.	MAGAZINES.			LICENSES.		
		Under renewed license.	Under new license.	TOTAL.	Renewed.	New.	TOTAL.
Assam	Darrang . .	...	1	1	...	1	1
	Kamrup . .	1	...	1	1	...	1
	Lokhimpur . .	2	6	8	2	6	8
	Naga Hills . .	1	...	1	1	...	1
	TOTAL . .	4	7	11	4	7	11
Bengal	Bardwan . .	11	...	11	8	...	8
	Darjeeling . .	2	...	2	2	...	2
	Hooghly . .	4	...	4	1	...	1
	24-Pargannas . .	2	...	2	1	...	1
	TOTAL . .	19	...	19	12	...	12
Bihar and Orissa	Gaya . .	3	...	3	3	...	3
	Hazaribagh . .	19	...	19	15	...	15
	Manbhum . .	28	2	30	25	2	27
	Sambalpur . .	1	...	1	1	...	1
	Santal Pargannas . .	3	...	3	3	...	3
	Singbhum . .	10	...	10	8	...	8
	TOTAL . .	64	2	66	55	2	57

APPENDIX A—contd.

List of Magazines and Licenses granted under Rule 46 and items 10 and 11 of Schedule II of the Indian Explosives Rules, 1914, for the year 1929
—contd.

Presidency or Province.	District.	MAGAZINES.			LICENSES.		
		Under renewed license.	Under new license.	TOTAL.	Renewed.	New.	TOTAL.
Bamby . . .	Aden . . .	4	...	4	4	...	4
	Almedabnd . .	4	...	4	4	...	4
	Bombay . . .	10	...	10	6	...	6
	Bombay Suburban.	6	1	7	6	1	6
	Breach . . .	1	...	1	1	...	1
	Karachi . . .	5	...	5	3	...	3
	Kelaba . . .	1	...	1	1	...	1
	Panch Mahals .	3	...	3	3	...	3
	Poona . . .	2	1	3	2	1	3
	Ratnagiri . .	2	...	2	2	...	2
	Surat . . .	2	...	2	2	...	2
	Thana . . .	1	...	1	1	...	1
	West Khandesh .	1	...	1	1	...	1
	TOTAL . . .	42	2	44	35	2	37
Burma . . .	Amlherst . . .	1	..	1	1	...	1
	Bassein . . .	2	...	2	2	...	2
	Hanthawaddy .	4	...	4	2	...	2
	Katha . . .	1	...	1	1	...	1
	Magwe . . .	1	...	1	1	...	1
	Mandalay . .	1	...	1	1	...	1
	Mergui . . .	1	...	1	1	...	1
	Myitkyinn . .	1	...	1	1	...	1
	Northern Shan States.	9	...	9	5	...	5
	Pegu . . .	1	...	1	1	...	1
	Carried over .	22	...	22	16	...	16

APPENDIX A.—contd.

List of Magazines and Licenses granted under Rule 46 and items 10 and 11 of Schedule II of the Indian Explosives Rules, 1914, for the year 1929—contd.

Presidency or Province.	District.	MAGAZINES			LICENSES.		
		Under renewed license.	Under new license	TOTAL.	Renewed	New.	TOTAL.
Burma . . .	Brought forward	22	.	22	16	...	16
	Tavoy . . .	6	...	6	4	...	4
	Thatun . . .	6	1	7	5	1	6
	Toungoo . . .	1	...	1	1	...	1
	TOTAL . . .	35	1	36	26	1	27
Central Provinces . . .	Alola . . .	1	...	1	1	...	1
	Amroli . . .	1	...	1	1	...	1
	Balaghat . . .	7	...	7	7	...	7
	Bhaidara . . .	1	...	1	1	...	1
	Bilaspur . . .	1	...	1	1	...	1
	Chanda . . .	5	...	5	4	...	4
	Chhindwara . . .	4	...	4	4	...	4
	Jubbulpur . . .	2	...	2	2	...	2
	Nagpur . . .	8	...	8	8	...	8
	Raipur . . .	3	...	3	3	...	3
	TOTAL . . .	33	...	33	32	...	32
Coorg . . .	Mercara . . .	1	...	1	1	...	1
	TOTAL . . .	1	...	1	1	...	1

APPENDIX A—concl'd.

List of Magazines and Licenses granted under Rule 46 and items 10 and 11 of Schedule II of the Indian Explosives Rules, 1914, for the year 1929—concl'd.

Presidency or Province.	District.	MAGAZINES.			LICENSES.		
		Under renewed license.	Under new license.	TOTAL.	Renewed.	New.	TOTAL.
Madras	Anantapur	1	...	1	1	...	1
	Chingleput	2	...	2	2	...	2
	Chittoor	2	...	2	2	...	2
	Coinbatore	...	1	1	...	1	1
	Golavani West	1	...	1	1	...	1
	Guntur	1	...	1	1	...	1
	Madras	13	1	14	6	1	7
	Madura	2	...	2	2	...	2
	Nellore	4	...	4	2	...	2
	North Arcot	1	...	1	1	...	1
	Ramnad	1	...	1	1	...	1
	South Arcot	4	...	4	4	...	4
	Tanjore	15	...	15	15	...	15
	Tinnevely	1	...	1	1	...	1
	Trichinopoly	7	...	7	7	...	7
	Vizagapatam	4	...	4	3	...	3
	TOTAL	50	2	51	49	2	51
Punjab	Attock	4	...	4	2	...	2
	Minnowali	1	...	1	1	...	1
	TOTAL	5	...	5	3	...	3
United Provinces	Meerut	1	...	1	3	...	3
	Shahjahanpur	1	...	1	1	...	1
	TOTAL	2	...	2	4	...	4

SUMMARY.

Presidency or Province.	MAGAZINES.			LICENSES.		
	Under renewed license.	Under new license.	TOTAL.	Renewed.	New.	TOTAL.
Assam . . .	4	7	11	4	7	11
Bengal . . .	19	...	19	12	...	12
Bihar and Orissa . .	64	2	66	55	2	57
Bombay . . .	42	2	44	35	2	37
Burma . . .	35	1	36	26	1	27
Central Provinces .	33	...	33	32	...	32
Coorg . . .	1	...	1	1	...	1
Madras . . .	59	2	61	49	2	51
Punjab . . .	5	...	5	3	...	3
United Provinces .	2	...	2	4	...	4
TOTAL .	264	14	278	221	14	235

APPENDIX B.

Summary of Magazines and Licenses granted under Rule 46 and items 10 and 11 of Schedule II for the 10 years ending 1929.

YEAR.	MAGAZINES			LICENSES.		
	Under renewed license.	Under new license.	TOTAL.	Renewed.	New.	TOTAL.
1920 . . .	237	8	245	180	6	186
1921 . . .	227	28	255	180	25	205
1922 . . .	237	20	257	190	19	209
1923 . . .	245	13	258	199	13	212
1924 . . .	247	31	278	204	28	232
1925 . . .	263	16	279	218	14	232
1926 . . .	265	19	284	218	18	236
1927 . . .	247	13	260	207	13	220
1928 . . .	258	19	277	217	16	233
1929 . . .	264	14	278	221	14	235

APPENDIX C.

Statement showing the imports of explosives by sea into British India from other countries in the year 1929.

Explosives.	Bengal.	Bombay.	Sind.	Burma.	Madras.	TOTAL.
<i>Quantity.</i>						
Gunpowder, black lbs.	72,200	15,055	—	20,550	3,875	111,680
" smokeless. "	11,700	895	—	70	3,285	15,950
Dynamite . . . "	252,000	33,750	—	55,000	155,000	495,750
Blasting gelatine . . . "	5,350	12,000	—	10,000	465,450	492,800
Gelignite or gelatine dynamite.	543,000	240,000	—	192,000	307,000	1,082,000
Other nitro-compound explosives.	150,000	—	—	—	71,500	221,500
Detonators . . . No.	2,000,000	589,584	—	1,070,502	3,372,240	8,022,326
Fireworks . . . lbs.	407,269	3,750,569	74,674	88,909	563,271	4,940,692
TOTAL . . .	1,241,510	4,088,209	74,674	368,520	1,569,381	7,800,372.
TOTAL . . . No.	2,000,000	589,584	—	1,070,502	3,372,240	8,022,326
<i>Value in rupees.</i>						
Gunpowder, black . . .	56,026	18,197	—	11,201	2,575	88,899
" smokeless . . .	17,071	3,832	—	299	2,015	23,220
Dynamite	162,228	22,605	—	93,410	111,962	410,205
Blasting gelatine . . .	4,580	10,006	—	10,430	397,003	431,030
Gelignite or gelatine dynamite.	251,914	174,740	—	280,062	231,537	950,362
Other nitro-compound explosives.	85,920	—	—	—	51,198	137,127
Detonators	101,552	17,128	—	56,695	5 07	227,372
Fireworks	271,075	1,105,110	49,364	39,306	229,559	1,694,414
TOTAL . . .	971,284	1,351,087	49,364	500,493	1,080,051	3,962,680

APPENDIX D.

Comparative statement showing the imports of explosives by sea into British India from other countries for the ten years ending 1929.

Explosives.	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
Gunpowder, black . . . lbs.	117,740	91,710	125,975	124,653	340,886	301,255	299,440	178,560	164,100	111,630
" smokeless . . . "	5,550	23,400	18,436	15,176	39,407	17,137	28,250	21,238	11,567	15,950
Dynamite "	303,300	523,000	275,000	351,350	398,122	500,700	315,200	304,750	451,550	495,750
Blasting gelatine "	600,000	102,000	530,100	649,350	486,500	457,995	316,050	271,500	410,800	492,800
Gelignite or gelatine dynamite . . . "	320,925	406,313	498,500	411,925	494,800	1,096,200	663,500	924,001	1,126,700	1,082,000
Other nitro-compound explosives . . . "	208,450	157,180	141,272	160,577	...	80,350	76,250	150,025	130,000	221,500
Detonators No.	2,752,968	3,694,702	3,055,057	3,796,380	4,115,050	6,881,024	6,242,556	6,910,498	8,872,023	8,022,326
Fireworks lbs.	2,792,388	3,710,807	3,838,853	3,391,338	3,800,633	3,397,572	4,970,986	3,819,678	4,422,887	4,940,622
TOTAL "	4,344,383	5,022,499	5,428,136	5,113,775	5,560,749	5,911,509	6,668,676	6,729,743	6,717,604	7,360,372
TOTAL No.	2,752,968	3,694,702	3,655,057	3,796,380	4,115,050	6,881,024	6,242,556	6,910,498	8,872,023	8,022,326

APPENDIX E.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Calcutta, the 19th May 1930.

No. E-11 (1).—With reference to the following Notifications publishing rules to regulate the manufacture, possession, sale, transport and importation of explosives, the following list of “ Authorised Explosives ” referred to in the rule mentioned against each Notification is published for general information:—

Rule 4 (3) of Notification No. 4013—33, dated the 6th June 1914, of the Government of India, Department of Commerce and Industry.

Rule 4 (3) of Notification No. 1183, dated the 11th November 1914, of the Chief Commissioner, Central Provinces, applicable to Berar.

Rule 4 (3) of Notification No. 14, dated the 23rd April 1915, of the Resident in Mysore applicable to the Civil and Military Station of Bangalore and on the Railways in Mysore under British Jurisdiction.

Rule 4 (3) of Notification No. 67-J., dated the 28th August 1914,	} of the Resident at Hyderabad applicable to the Cantonments of Secunderabad and Aurangabad, the Hyderabad Residency Bazzars and the Railway lands in the Hyderabad State.
Rule 4 (3) of Notification No. 34-J., dated the 20th April 1915,	

Rule 3 (3) of Notification No. 99, dated the 19th July 1916, as amended by Notification No. 41, dated the 30th July 1928, of the Government of Burma applicable to the Federated Shan States.

Rule 3 (3) of Notification No. 5313, dated the 29th October 1918, of the Agent to the Governor General in Rajputana.

Rule 3 (3) of Notification No. 1812-B., dated the 10th November 1919, of the Agent to Governor General in Central India, applicable to Railway lands in Central India, specified in the Notification of the Government of India in the Foreign Department No. 261-I. B., dated 10th February 1913.

LIST OF AUTHORISED EXPLOSIVES.

The following explosives are at present authorised for importation into British India for general sale:—

CLASS 1.—GUNPOWDER.

The term “ gunpowder ” means gunpowder ordinarily so called.

GUNPOWDER.

CLASS 2.—NITRATE MIXTURE.

The term "nitrate mixture" means any preparation, other than gunpowder ordinarily so called, formed by the mechanical mixture of a nitrate with any form of carbon or with any carbonaceous substance not possessed of explosive properties, whether sulphur be or be not added to such preparation, and whether such preparation be or be not mechanically mixed with any other non-explosive substance, and includes any explosive containing a perchlorate and not being a chlorate-mixture, fulminate or nitro-compound as defined in Rule 4 of the Indian Explosives Rules, 1914.

EVERY BLASTING EXPLOSIVE IN THIS CLASS, IN WHICH NITRATE OF AMMONIUM, NITRATE OF SODIUM OR CHLORIDE OF SODIUM ARE USED AS INGREDIENTS, SHALL BE CONTAINED IN CARTRIDGE WRAPPERS OR CASES (OR IN FIVE-POUND INNER PACKAGES) MADE THOROUGHLY WATERPROOF WITH MELTED PARAFFIN OR OTHER SUITABLE WATERPROOFING MATERIAL.

BOBBINITE.

Carbox Composition.

M Powder.	}
Pranada.	
Q Powder.	

CLASS 3.—NITRO-COMPOUND.

The term "nitro-compound" means any chemical compound possessed of explosive properties, or capable of combining with metals to form an explosive compound, which is produced by the chemical action of nitric acid (whether mixed or not with sulphuric acid) or of a nitrate mixed with sulphuric acid upon any carbonaceous substance, whether such compound is mechanically mixed with other substances or not.

The nitro-compound class has two divisions.

EVERY EXPLOSIVE IN THIS CLASS AND EVERY EXPLOSIVE INGREDIENT THEREOF SHALL BE SO THOROUGHLY PURIFIED AND OTHERWISE OF SUCH CHARACTER AS TO SATISFY A TEST KNOWN AS THE HEAT TEST, AND SPECIFIED IN THE RULE FOR TESTING EXPLOSIVES PUBLISHED WITH GOVERNMENT OF INDIA, DEPARTMENT OF COMMERCE AND INDUSTRY, NOTIFICATION No. 4013—33, DATED THE 6TH JUNE 1914, REFERRED TO ABOVE.

EVERY BLASTING EXPLOSIVE IN THIS CLASS, IN WHICH NITRATE OF AMMONIUM, NITRATE OF SODIUM, CHLORIDE OF SODIUM OR NITRO-GLYCOL ARE USED AS INGREDIENTS, SHALL BE CONTAINED IN CARTRIDGE WRAPPERS OR CASES (OR IN FIVE-POUND INNER PACKAGES) MADE THOROUGHLY WATERPROOF WITH MELTED PARAFFIN OR OTHER SUITABLE WATERPROOFING MATERIAL.

DIVISION 1.

Division 1 comprises the following explosives and any chemical compound or mechanically mixed preparation which consists either wholly or partly of nitro-glycerine or of some other liquid nitro-compound:—

Amazonite.	Cordite.
Brocalite Gelatine.	Cordite, M. D.
Gelignite K. 34 per cent.,	Du pont Dynamite, 75 per cent.
N. G.	Strength.
Glycerita.	Dynamit.
L. G. Gelatine.	Dynamite.
25 per cent. Ligdyn.	Dynamite No. 1.
Ardeer Gelignite.	Red Star Dynamite, 75 per cent.
Arkite.	Strength.
Samsonita.	Dynobel No. 2.
Samsonite.	Dynobel (Export) No. 3.
A. 2. Monobel.	Dynobel No. 3.
Viking (Export) No. 1.	Dynobel No. 4.
Viking (Export) No. 2.	Farmers' Dynamite.
Viking Powder No. 1.	Gelatine Dynamite.
Viking Powder No. 2.	Gelignite.
Ballistite.	Monobel No. 1.
Blasting Gelatine.	Quarry Monobel.
Cambrite.	Rockite.
Chilworth Smokeless Powder	Stonobel.
No. 2.	Victor Powder No. 2.
Nacota Powder.	

PROVIDED THAT EVERY EXPLOSIVE IN THIS DIVISION SHALL BE OF SUCH CHARACTER AND CONSISTENCY AS NOT TO BE LIABLE TO LIQUEFACTION OR EXUDATION.

PROVIDED ALSO THAT AN EXPLOSIVE WHICH IS REQUIRED BY DEFINITION TO BE ISSUED IN WATERPROOF INNER PACKAGES MAY BE EXEMPTED FROM SUCH REQUIREMENT BY SPECIAL AUTHORITY, WHEN AND SO LONG AS THE CONDITIONS OF SUCH AUTHORITY ARE OBSERVED.

DIVISION 2.

Division 2 comprises the following explosives and any nitro-compound as before defined which is not comprised in division 1:—

Alumatol.	Guncotton.
Ammonal.	Negro Powder No. 2.
Amberite, No. 2.	N. S. Smokeless.
Di-nitro-phenol.	Picric Acid.
Economic Smokeless Sporting	Picric Powder.
Powder.	Roburite No. 4.
E. C. Sporting Powder.	Ruby Powder.
Eley Smokeless Sporting	Schultze Gunpowder.
Powder.	Smokeless Diamond.
Empire Powder.	Tonite or Cotton Powder.
Ideal Powder.	Tri-nitro-toluol.
Light Load Smokeless.	
Nobel's Special Powder.	

CLASS 4.—CHLORATE MIXTURE.

The term "chlorate mixture" means any explosive containing a chlorate.

The chlorate mixture class has two divisions.

EVERY EXPLOSIVE IN THIS CLASS AND EVERY EXPLOSIVE INGREDIENT THERE-OF SHALL BE SO THOROUGHLY PURIFIED AND OTHERWISE OF SUCH CHARACTER AS TO SATISFY A TEST KNOWN AS THE HEAT TEST, AND SPECIFIED IN THE RULE FOR TESTING EXPLOSIVES PUBLISHED WITH GOVERNMENT OF INDIA, DEPARTMENT OF COMMERCE AND INDUSTRY, NOTIFICATION No. 4013—33, DATED THE 6TH JUNE 1914, REFERRED TO ABOVE.

EVERY BLASTING EXPLOSIVE IN THIS CLASS, IN WHICH NITRATE OF AMMONIUM, NITRATE OF SODIUM OR CHLORIDE OF SODIUM ARE USED AS INGREDIENTS, SHALL BE CONTAINED IN CARTRIDGE WRAPPERS OR CASES (OR IN FIVE-POUND INNER PACKAGES) MADE THOROUGHLY WATERPROOF WITH MOLTED PARAFFIN OR OTHER SUITABLE WATERPROOFING MATERIAL.

DIVISION 1.

Division 1 comprises any chlorate preparation which consists partly of nitro-glycerine or of some other liquid nitro-compound.

Nil.

PROVIDED THAT EVERY EXPLOSIVE IN THIS DIVISION SHALL BE OF SUCH CHARACTER AND CONSISTENCY AS NOT TO BE LIABLE TO LIQUEFACTION OR EXUDATION.

DIVISION 2.

Division 2 comprises any chlorate mixture as hereinbefore defined, which is not comprised in Division 1.

Nil.

CLASS 5.—FULMINATE.

The term "fulminate" means any chemical compound or mechanical mixture, whether included in the foregoing classes or not, which, from its great susceptibility to detonation, is suitable for employment in percussion caps or any other appliances for developing detonation, or which, from its extreme sensibility to explosion, and from its great instability (that is to say, readiness to undergo decomposition from very slight exciting causes), is especially dangerous.

This class consists of two divisions.

DIVISION 1.

Division 1 comprises such compounds as the fulminates of silver and of mercury, and preparations of those substances, such as are used in percussion caps; and any preparation consisting of a mixture of a chlorate with phosphorus or certain descriptions of compounds of phosphorus, with or without the addition of carbonaceous matter, and any preparation consisting of a mixture of a chlorate with sulphur, or with a sulphuret, with or without carbonaceous matter.

Nil.

DIVISION 2.

Division 2 comprises such substances as the chloride and the iodide of nitrogen, fulminating gold and silver, diazobenzol, and the nitrate of diazobenzol.

Nil.

CLASS 6.—AMMUNITION.

The term "ammunition" means any explosive of any of the foregoing classes when the same is enclosed in any case or contrivance, or is otherwise adapted or prepared so as to form a cartridge or charge for small-arms, cannon or any other weapon, or for blasting or to form any safety or other fuze for blasting or for shells, or to form any tube for firing explosives or to form a percussion cap, detonator, fog-signal, shell, torpedo, war-rocket, or any other contrivance other than a firework.

*The term "percussion cap" does not include a detonator.**

The term "detonator" means a capsule or case which is of such strength and construction and contains fulminate in such quantity, that the explosion of one capsule or case would communicate the explosion to other like capsules or cases.

The term "safety fuze" means a fuze for blasting which burns and does not explode and which does not contain its own means of ignition, and which is of such strength and construction and contains an explosive in such quantity that the burning of such fuze will not communicate laterally with other like fuzes.

The ammunition class has three divisions.

DIVISION 1.

Nobel's Safety Electric Time Fuze.	Safety Cartridges.
Percussion Caps.	Safety Fuzes for blasting.
Railway Fog-Signals.	Safety Electric Fuzes.

* In consequence of the results of experiments carried out, it has been decided that a percussion cap can only be properly classed as such if it contains less than 0.6 grain of a composition of the 1st Division of the 5th (Fulminate) class of which not more than 25 per cent. consists of fulminate of mercury or less than 0.5 grain of any other explosive of the 1st Division of the 5th (Fulminate) Class; and it has been further decided that percussion caps shall not be classed as such when they contain anvils or have their composition unprotected by tin foil or other suitable substance, as under those circumstances they are liable to explode en masse.

DIVISION 2.

Division 2 comprises any ammunition as hereinbefore defined, which does not contain its own means of ignition, and is not included in Division 1.

Cartridges for Blasting or other like purposes.
Cartridges for Small Arms which are not Safety Cartridges.

Cordeau Bickford.
Electric Fuzes.
Electric Primers.
Fuze Lighters.
Instantaneous Fuze.
Port Fires.
Tubes for firing Explosives.
Quick Match.

DIVISION 3.

Division 3 comprises any ammunition as hereinbefore defined which contains its own means of ignition, and is not included in Division 1.

Cartridges for small Arms which are not Safety Cartridges.

Detonators.
Electric Detonators.
Friction Tubes.
Nobel's Electric Detonator Time Fuze.
Percussion Primers.
Tubes for firing Explosives.

CLASS 7.—FIREWORK.

The term "firework" comprises firework composition and manufactured fireworks.

DIVISION 1.—FIREWORK COMPOSITION.

The term "firework composition" means any chemical compound or mechanically mixed preparation of an explosive or inflammable nature, which is used for the purpose of making manufactured fireworks, and is not included in the former classes of explosives, and also any star and any coloured fire composition subject to the proviso to the definition of manufactured fireworks.

Nil.

DIVISION 2.—MANUFACTURED FIREWORKS.

MANUFACTURED FIREWORKS, consisting of any explosive of the classes 1, 2, 3, 4 and 6 and any firework composition, when such explosive or composition is enclosed in any case or contrivance or is otherwise manufactured so as to form a squib, cracker including chinese crackers, toy cap or amoree, serpent, rocket (other than a war-rocket), maroon, lance, wheel, Chinese fire, Roman candle, or other article specially adapted for the production of pyrotechnic effects, or pyrotechnic signals or sound signals.

Provided that a substantially constructed and hermetically closed metal case, containing not more than one pound of coloured fire composition of such a nature as not to be liable to spontaneous ignition shall be deemed to be a "manufactured firework" and not a "firework composition."

Aluminium Torches.	}
Electric Sparklers.	
Magnesium Torches.	
Amorces.	
Chinese Crackers.	
Light Signals.	
Manufactured Fireworks.	
Pyrotechnic Matches.	
Rockets.	
Sparklers.	

N. L. SHELDON,
Chief Inspector
of Explosives in India.

APPENDIX F.

*List of petroleum premises licensed during the year 1929.

Presidency or Province.	District.	No.	Presidency or Province.	District.	No.
Ajmer-Merwara	Ajmer . . .	18		Brought forward . .	416
	TOTAL . . .	18		Hooghly . . .	18
Assam . . .	Cachar . . .	12	Bengal—contd.	Howrah . . .	37
	Darrang . . .	11		Jalpaiguri . . .	25
	Goonpara . . .	15		Jessore . . .	4
	Kamrup . . .	16		Khulna . . .	19
	Khasi and Jaintia Hills . . .	8		Malda . . .	7
	Lakhimpur . . .	21		Midnapur . . .	46
	Naga Hills . . .	6		Murshidabad . . .	
	Nowgong . . .	5		Mymensingh . . .	47
	Sibsagar . . .	14		Nadia . . .	25
	Sylhet . . .	45		Noakhali . . .	11
	TOTAL . . .	148		Pabna . . .	19
Baluchistan . . .	Quetta . . .	13		Rajshahi . . .	27
	Loralai . . .	3		Rangpur . . .	52
	Sibi . . .	5		Tippera . . .	51
	Zhob . . .	5		24-Pargannas . . .	39
	TOTAL . . .	26		TOTAL . . .	852
Bengal . . .	Hackerganj . . .	39	Bihar and Orissa	Balasore . . .	10
	Baukura . . .	13		Bhagalpur . . .	42
	Birbhum . . .	14		Champaran . . .	19
	Bogra . . .	17		Cuttack . . .	15
	Burdwan . . .	57		Darbhanga . . .	31
	Calcutta . . .	150		Gaya . . .	38
	Chittagong . . .	24		Hazaribagh . . .	27
	Dacca . . .	40		Manbhum . . .	57
	Darjeeling . . .	29		Monghyr . . .	33
	Dinajpur . . .	7		Muraffarpur . . .	36
	Faridpur . . .	26		Carried over . . .	303
	Carried over . . .	416			

*This list includes installations and godowns for the storage of dangerous non-dangerous petroleum regarding which this department has cognizance.

APPENDIX F—contd.

* List of petroleum premises licensed during the year 1929—contd.

Presidency or Province.	District.	No.	Presidency or Province.	District.	No.
Bihar and Orissa —contd.	Brought forward .	803	Bombay—contd.	Brought forward .	625
	Palamau . . .	9		Larkana . . .	6
	Patna . . .	60		Nasik . . .	52
	Puri . . .	9		Pauch Mahals .	11
	Purnea . . .	22		Poona . . .	39
	Ranchi . . .	22		Ratnagiri . . .	58
	Sambalpur . . .	12		Satara . . .	38
	Saran . . .	27		Sholapur . . .	37
	Statnabad . . .	28		Sukkur . . .	10
	Singhbhum . . .	33		Surat . . .	34
	Sonthal Parganas .	24		Thana . . .	26
	TOTAL .	630		TOTAL .	626
Bombay .	Aden . . .	24	Burma .	Amherst . . .	9
	Ahmedabad . . .	65		Bassein . . .	4
	Ahmednagar . . .	19		Bhamo . . .	3
	Belgaum . . .	42		Hanthawaddy .	5
	Bijapur . . .	11		Insein . . .	3
	Bombay . . .	182		Katln . . .	3
	Broach . . .	19		Kyaukse . . .	1
	Dharwar . . .	60		Lower Chindwin .	6
	Hyderabad (Sind) .	11		Magwe . . .	58
	Kaira . . .	29		Mandalay . . .	14
	Karachi . . .	52		Manbha . . .	7
	East Khandesh . .	55		Meiktila . . .	3
	West Khandesh . .	24		Mergui . . .	11
	Kolaba . . .	27		Minbu . . .	19
	Kolhapur . . .	5		Nyaungmya . . .	10
	Carried over .	625		Myingyan . . .	6
				Carried over .	162

* This list includes installations and godowns for the storage of dangerous and non-dangerous petroleum regarding which this department has cognizance.

APPENDIX F—contd.

*List of petroleum premises licensed during the year 1929—contd.

Presidency or Province.	District.	No.	Presidency or Province.	District.	No.
Burma—contd.	Brought forward	162	Central Pro- vinces—contd.	Brought forward	219
	Myitkyin	8		Damoh	3
	Northern Shan States	15		Drug	10
	Pakokn	12		Ho-shangahad	20
	Pegu	20		Jubbulpore	25
	Prome	10		Mandla	2
	Rangoon	40		Nagpur	47
	Sagaing	2		Narsingpur	5
	Sandoway	2		Nimar (Khandwa)	16
	Southern Shan States	10		Raipur	22
	Tavoy	13		Saugor	0
	Tharrawaddy	3		Seoni	5
	Thaton	7		Wardha	23
	Thayetmyo	13		Ycotmal	32
	Upper Chindwin	3		TOTAL	438
	Yamethin	7		Coorg	4
	TOTAL	336		TOTAL	4
Central India	Bhopal (Ry. land)	2	Delhi	Delhi	24
	TOTAL	2		TOTAL	24
Central Pro- vinces.	Akola	51	Hyderabad	Hyderabad	34
	Amraoti	43		TOTAL	34
	Balaghat	10			
	Betul	8	Madras	Anantapur	19
	Bhandara	25		Bellary	21
	Bilaspur	17		Chingleput	25
	Buldana	36		Chittoor	21
	Chanda	20		Coimbatore	72
	Chhindwara	10		Carried over	158
	Carried over	219			

* This list includes installations and godowns for the storage of dangerous and non-dangerous petroleum regarding which this department has cognizance.

APPENDIX F—*contd.** *List of petroleum premises licensed during the year 1929—contd.*

Presidency or Province.	District.	No.	Presidency or Province.	District.	No.
Madras— <i>contd.</i>	Brought forward .	158	North-West Frontier Pro- vince.	Hazara . . .	15
	Cuddapah . . .	11		Kohat . . .	8
	Gaujam . . .	16		Peshawar . . .	38
	East Godavari . . .	31		TOTAL . . .	61
	West Godavari . . .	28		Ambala . . .	28
	Guntur . . .	24		Amritsar . . .	16
	Kistna . . .	33		Attock . . .	10
	Kurnool . . .	21		Dera Ghazi Khan . . .	5
	Madras . . .	48		Forezoporo . . .	17
	Madura . . .	52		Gujranwala . . .	17
	Malabar . . .	53		Gujrat . . .	12
	Nellore . . .	21	Punjab . . .	Gurdaspur . . .	33
	North Arcot . . .	50		Gurgaon . . .	9
	The Nilgiris . . .	28		Ilissar . . .	13
	Ramnad . . .	60		Hoshiarpur . . .	9
	Salem . . .	22		Jholm . . .	8
	South Arcot . . .	41		Jullundur . . .	17
	South Canara . . .	35		Kangra . . .	1
	Tanjore . . .	55		Karnal . . .	13
	Tinnevelly . . .	20		Labore . . .	35
	Trichinopoly . . .	31		Ludhiana . . .	14
	Vizagapatam . . .	31		Lyalpur . . .	25
	TOTAL . . .	878		Mian Wali . . .	2
				Multan . . .	8
Mysore . . .				Patiala . . .	5
	Bangalore . . .	38		Rawalpindi . . .	39
	Kolar . . .	5		Shahpur . . .	13
	TOTAL . . .	43		Sheikhupura . . .	9
				Sialkot . . .	12
				TOTAL . . .	370

* This list includes installations and godowns for the storage of dangerous and non-dangerous petroleum regarding which this department has cognizance.

APPENDIX F—concl'd.

* List of petroleum premises licensed during the year 1929—concl'd.

Presidency or Province.	District.	No.	Presidency or Province.	District.	No.
United Provin- ces.	Agra	16	United Provin- ces—cont'd.	Brought forward . .	275
	Allgarh	20		Gonda	17
	Allahabad	20		Gorakhpur	20
	Almora	2		Hamirpur	7
	Azamgarh	11		Jaloun	4
	Bahraich	7		Jaunpur	1
	Ballia	4		Jhansi	20
	Banda	7		Kheri	12
	Bara Banki	12		Lucknow	29
	Barilly	12		Mainpuri	8
	Basti	18		Mecut	23
	Benares	27		Mirzapore	10
	Bijnor	6		Moradabad	3
	Budaun	4		Muttra	9
	Bulandshahr	8		Muzaffarnagar	10
	Cawnpore	26		Naini Tal	11
	Dehra Dun	21		Partabgarh	13
	Etah	5		Pilibhit	3
	Etawah	8		Rae Bareilly	9
	Farrukhabad	15		Saharanpur	17
	Fatehpur	8		Shahjahanpur	6
	Fyzabad	9		Sitapur	11
	Garhwal	5		Sultanpur	7
	Ghazipur	4		Unao	8
	Carried over . .	275		TOTAL	539

* This list includes installations and godowns for the storage of dangerous and non-dangerous petroleum regarding which this department has cognizance.

SUMMARY.

Presidency or Province.	No.
Ajmer-Merwara	18
Assam	148
Baluchistan	30
Bengal	852
Bihar and Orissa	589
Bombay	9,6
Burma	383
Central India	2
Central Provinces	438
Coorg	4
Delhi	24
Hyderabad	34
Madras	878
Mysore	43
North-West Frontier Province	61
Punjab	370
United Provinces	579
TOTAL .	5,218

APPENDIX G.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1929 to 31st December 1929.

EXPLOSIVES.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.
1	18th January 1929.	Gunpowder	Sircar Udappam, (Kasipur).	Three persons manufactured gunpowder for preparation of crackers for a village festival. As the powder was not dry, they placed the earthen pot containing the powder over an oven. The powder exploded injuring them fatally.	3	...
2	8th February 1929.	Ditto	At Pollachi, District Coimbatore.	Four women were pounding charcoal, saltpetre and sulphur in a shed for manufacture of country gunpowder. A man was drying the wet mixture outside the shed on a bamboo mat. The powder outside took fire and spread to the mixture inside. The four women inside the room were suffocated to death and the man subsequently died in the Hospital. The fire was probably due to the man throwing the remains of a lighted 'biddi' (Indian cigarette) into the powder.	5	...
3	Ditto	Ditto	Khewra	A report on this accident is given in Appendix K.	0	...
4	19th Mar. 1929.	Ditto	Mascallipatti	A person was injured by the explosion of gunpowder whilst he was filling a hole with the same in connection with blasting operations which were being carried out in a well. Five persons who had illicitly manufactured the gunpowder in question were prosecuted and sentenced to pay a fine of Rs. 12 each.	...	1
5	11th April 1929.	Ditto	Bilaspur	A well was being sunk in the compound of the Irrigation Inspection but and three persons were engaged for blasting rock. On the day of occurrence seven holes were bored, 3 of which were filled with charges. While the fourth hole was being rammed in with murrum after gunpowder had been put in, an explosion occurred killing one man and injuring the two others. The explosion carried over.	1	2
					18	3

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1929 to 31st December 1929,

EXPLOSIVES—*contd.*

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
				Brought forward	18	3
6	18th April 1929.	Gunpowder	Chikli	was probably due to pieces of stone getting mixed with the murrum. Two males and two females were engaged in making blasting powder when an explosion took place. Three of them were killed and one female was badly injured. It is suspected that the explosion was due to smoking.	3	1
				TOTAL	21	4
7	20th July 1929.	Dynamite	Palaw, Burma.	A person was fatally injured by the explosion of a wet dynamite cartridge left in the possession of another worker whilst he was warming it over a fire.	1	...
				TOTAL	1	..
8	9th September 1929.	Fulminate	Bombay	Having learnt that a mixture of sulphur, copper sulphate and potash would give a fine powder for fireworks, an employee of a local Druggist made up this mixture and an explosion occurred which injured him.	...	1
9	18th October 1929.	Ditto	Calcutta	A person who was in the habit of preparing throwdown crackers and secretly selling them met his death by the accidental explosion of a bomb which he was manufacturing.	1	...
				TOTAL	1	1
10	16th March 1929.	Detonator	Calcutta	An Armenian lad, who obtained a detonator from a fellow student which the latter picked up in a road near a colliery at Kulti where he was staying with his uncle and brought down to Calcutta in a box attempted to pick out its contents with the point of a compass when it exploded causing injuries to his left hand.	...	1
				TOTAL	...	1

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1929 to 31st December 1929.

EXPLOSIVES—contd.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
11	14th March 1929.	Fireworks	Calcutta	One of the occupants of the house prepared some fireworks powder for manufacture of fireworks on the occasion of a marriage ceremony, but left some powder near the stone on which it was ground. A girl picked up the remains and while grinding the powder on the stone an explosion occurred causing injuries to her.	...	1
12	2nd June 1929.	Ditto	Kurlikot	At a fireworks display on the occasion of a marriage ceremony, a khalasi after letting off some fireworks with a burning rope placed it on the handle of a palanquin beneath which lay a canister of gunpowder and began to fill some more vessels with powder from the canister when accidentally the burning rope fell on the canister. There was immediately an explosion causing injuries to the khalasi and five by-standers. Of the injured one died in hospital. The khalasi was prosecuted and convicted under Section 304-A, I. P. C. and sentenced to pay a fine of Rs. 100 in default six months' imprisonment.	1	5
13	15th July 1929.	Ditto	Vyasarpadi, Madras.	In a licensed manufactory nine persons were filling squibs each with a heap of explosive mixture kept nearby. The filling was done by trickling the mixture into a tube and ramming it home with a rod. There was an explosion and all were badly burnt. Seven of them died later in hospital.	7	2
14	27th September 1929.	Ditto	Ulsur, Bangalore.	A boy loaded a bicycle metal pump with explosive and arranged a fuse. While setting fire to it, the pipe burst and he sustained injuries and died in hospital. Five boys who were standing close by were also injured by the broken pieces of metal and one of them died in hospital.	2	4
Carried over					10	12

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1929 to 31st December 1929.

EXPLOSIVES—*concl'd.*

No.	Date of accident.	Nature of Explosivo.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
15	26th October 1929.	Fireworks	Baranagar, 24-Parganas	Brought forward A boy was preparing powders for fireworks on a grind stone. An explosion occurred and he was fatally injured.	10 ...	12 1
16	6th November 1929.	Ditto	Calcutta	A boy exploded a cracker which he had prepared with a mixture of potassium chlorate and sulphur and was severely injured from the effects of which he died.	1	...
Total					11	13
17	21st June 1929.	Liquid Oxygen.	Chola	During blasting operations in the Ulhasi river near the discharge outfall chamber three coolies placed liquid oxygen charges in a boat to carry them to the point where they were to be dropped into the water. While the boat was being rowed, the charges exploded resulting in the death of all the coolies.	3	...
Total					3	...

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1929 to 31st December 1929.

PETROLEUM.

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
1	1st January 1929.	Petrol	Calcutta	While a motor bus was taking petrol from a pump on Russa Road, the tank suddenly caught fire. The petrol pipe was immediately withdrawn by the shop attendant who was slightly burnt on his knee. The fire was attributed to the presence of lights in the bus.	...	1
Carried over					...	1

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1929 to 31st December 1929.

PETROLEUM—contd.

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
2	23rd January 1929	Petrol	Calcutta	Brought forward A driver of a private motor car No. 21298 was taking petrol from a petrol pump when the pipe caught fire. The driver who was near the pump pulled out the pipe to save the car and his clothes caught fire. He got extensive burns and died in hospital. It is suspected that a friend of the deceased standing close by lighted a match while petrol was being filled into the car.	1	1
3	6th February 1929.	Crude oil.	Thilawa, Burma.	A report on this accident is given in Appendix L.	7	1
4	7th March 1929.	Petrol	Mergui River.	A fire broke out in a country boat containing 200 tins of petrol and other sundry goods. After some of passengers had gone ashore, a boat man lighted a lamp and began to bail out water collected at the bottom of the boat. The boat caught fire and one boatman was slightly burnt, the others swimming to the bank safely. The fire was due to carelessness in using a naked light in a boat loaded with petrol.	...	1
5	10th March 1929.	Petroleum	Minlingdanug, Yenangyang Oilfields.	A fire took place in B. O. Co.'s Well No. 1056 at Block GS Minlingdanug, Yenangyang Oilfields, Burma. The well was gassing and flowing water at the time of the accident. The well ignited and four men employed on the well were seriously burnt. They could not say how the fire started.	...	4
6	19th March 1929.	Petroleum	No. 4 Jetty, Budge Budge.	A report on this accident is given in Appendix M.	...	6
7	29th March 1929.	Petrol	Calcutta	A petrol pump at 13, Circular Garden Beach Road caught fire on the 29th March 1929. One	...	1
Carried over					8	14

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1929 to 31st December 1929.

PETROLEUM—contd.

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
				Brought forward man was injured. The fire was caused by a Bus driver striking a match to examine the contents of the petrol tank of his bus.	8	14
8	4th April 1929.	Crude oil	Syriam, Burma.	A report on this accident is given in Appendix N.	7	7
9	21st April 1929.	Petrol	Sewri	An explosion occurred on board a barge (Kothia "Harsinghar") containing 4,000 tins of petrol on 21st April 1929 at Sewri Bunder, Bombay. It was evidently a gas explosion only as the petrol tins did not become ignited. Smoking was the cause.	...	1
10	2nd May 1929.	Petroleum	Syriam	On 2nd May 1929 there was an explosion in a tank in the Burmah Oil Company's Refinery at Syriam and one man was killed. It was found to be due to the use of a wooden dipping pole having metal screws at the joints. These poles have been done away with and light steel tapes used in their place.	1	...
11	4th May 1929.	Petrol	Bapatla Station.	When a consignment of petrol tins was being unloaded from a covered wagon, the guard with his hand signal lamp entered the wagon to examine the destination of some of the tins. The petrol vapour from leaky tins caught fire and two men who were inside the wagon were slightly burnt.	...	2
12	11th May 1929.	Crude oil.	Khaur	On 11th May 1929 ten labourers of the Attock Oil Co., Khaur, were on night duty on oil Well No. 88 and were sleeping inside the shed. At about 11-30 p.m., Mahesh Dass, fireman started the boiler which is at a distance of about 36 yards from the well by means of gas fuel when suddenly both oil and gas began	6	1
Carried over					22	25

Accidents by fire or explosion which have been brought to the notice of the Explosives Department, from 1st January 1929 to 31st December 1929.

PETROLEUM—contd.

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
				Brought forward to flow out of the well. The gas caught fire from the sparks from the boiler and immediately spread all round the sleeping labourers. Three of them managed to escape, one received minor burns, and two died on the spot, the remaining 4 expired later in the Khaur Hospital.	22	25
13	1st June 1929.	Petrol	Harpalpur	A consignment of 500 tins of petrol was being unloaded after sunset from a covered wagon. There was an accumulation of gas from some leaky tins which was ignited from a guard's hand signal lamp. Four persons who were inside the wagon were badly burnt, one of them succumbed to his injuries in the hospital.	1	3
14	27th June 1929.	Do.	Wadala	Some hundreds of gallons of petrol which had leaked out the storm water drain near the Burmah Shell Oil Storage and Distributing Company's bulk petrol installation at Wadala caught fire. Petrol traps are being installed.	...	...
15	2nd July 1929.	Crude oil.	Khaur oil-field.	Two coolies were working on the derrick of a well when the well took fire on account either of the bursting of an electric lamp or from a spark from the electric wiring. Both of them tried to slide down the derrick guy wire. One of them lost his hold and fell down and was killed.	1	...
16	28th August 1929.	Petrol	Calcutta	A petrol tank wagon caught fire at Kalighat on the 28th August 1929. The petrol was ignited by a steel rod used for dipping coming into contact simultaneously with the tank wagon and the electric mains.	...	...
Carried over					24	28

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1929 to 31st December 1929.

PETROLEUM—concl'd.

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
17	31st Aug. 1929.	Petroleum	Syriam, Burma.	Brought forward On the 31st August 1929 there was an explosion in tank No. G.M. 2 near Bench C of the Burmah Oil Co.'s Refinery at Syriam. The explosion was probably due to lightning.	24	29
18	24th Sep. 1929.	Ditto	Khaur	A fire started just outside the rig of well No. 60 A. The cause of the fire was suspected to be due to a cooler smoking close to the rig. His clothes caught fire and he received burns from the effects of which he died in hospital.	1	...
19	24th Nov. 1929.	Ditto	Kalyan	A railway porter sustained serious burns which resulted in his death as the result of entering a covered railway wagon containing one tin of kerosine oil and a considerable amount of straw dunnage soaked with oil, these becoming ignited by his striking a match.	1	...
20	1st Dec. 1929.	Ditto	Sewri	On the 1st December 1929 there was a small explosion in No. 2 million gallon kero-ene tank at the Indo-Burma Petroleum Co.'s Installation at Sewri. Water was being pumped at the time into the tank from the tanker lying at the Alexandra Dock.	...	...
TOTAL					25	28

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1929 to 31st December 1929.

MISCELLANEOUS.

No.	Date of accident.	Nature of Substance.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
1	21st June 1929.	Bleaching Powder.	Howrah	Two drums of bleaching powder exploded at Howrah Goods Shed on the 21st June 1929 as a result of which one person was injured. There have been similar cases of this occurrence and it has in every instance been bleaching powder which has been taken out of its original European package and has been repacked in India. There have been no cases of European packed bleaching powder exploding if left in its original package. Climate must be responsible for this.	...	1
2	24th Aug. 1929.	Carbide of Calcium.	Calcutta	At about 8 p.m. a Khilasi of the Shalimar Works Ltd. entered a hut in the Tallah Water Works Pumping Station where 20 lbs. of Carbide of Calcium were stored. He was carrying a lamp and without authority opened the container carrying the carbide. The carbide caught fire and he was burnt about the hands, chest and face.	...	1
3	9th September 1929.	Spirit of Wine.	Masjid	A railway employee in trying to re-seal a tin containing about 2 gallons of spirit of wine in the Railway store room by means of sealing wax after stealing 4 oz. of spirit held a lighted match too close to the tin causing it to catch fire and explode. He was severely burnt all over the body and later died.	1	...
4	4th October 1929.	Matches	Calcutta	Some matches ignited whilst being carried in one of the wooden frames in which the matches are packed for drying and three men were burnt about the body and arms. No definite evidence could be obtained as to the cause of the fire.	...	3
TOTAL					1	5

APPENDIX H.

Summary of accidents during the year 1929.

Explosives or dangerous and inflammable substances.	ACCIDENTS CAUSING LOSS OF LIFE AND BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	NUMBER OF PERSONS.			
		Killed.	Injured.		
<i>Explosives</i>					
Gunpowder . . .	6	21	4	...	6
Nitro-compounds . .	1	1	...	...	1
Chlorate Mixture . .	...	...	...	...	...
Fulminates . . .	2	1	1	...	2
Ammunition . . .	1	...	1	...	1
Fireworks . . .	6	11	13	...	6
Liquid Oxygen . . .	1	2	...	...	1
TOTAL . . .	17	37	19	...	17
<i>Petroleum.</i>					
Petroleum generally . .	10	26	28	4	20
TOTAL . . .	10	26	28	4	20
Chemicals . . .	...	...	...	...	...
TOTAL . . .	...	...	...	...	...
Miscellaneous . . .	4	1	5	...	4
TOTAL . . .	4	1	5	...	4
GRAND TOTAL . . .	37	64	52	4	41

APPENDIX I.

Detailed statement showing the number of accidents and persons killed and injured during the ten years ending 1929.

Year.	GUNPOWDER.			DYNAMITE AND OTHER NITRO-COMPOUND BLASTING EXPLOSIVES.			CHLORATE MIXTURE.			FULMINATE.			AMMUNITION.			FIREWORKS.			LIQUID OXYGEN EXPLOSIVES.		
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1920 .	8	4	11	..	..	..	..	..	..	3	0	21	6	1	9	2	4	1	..	..	..
1921 .	5	7	4	1	3	15	..	..	..	4	3	6	1	1	3	6	7	11	..	..	..
1922 .	4	7	7	..	..	..	1	1	..	3	2	5	1	..	1	1	..	1	..	..	..
1923 .	17	36	19	..	..	..	..	..	..	5	9	16	6	..	7	6	18	15	..	..	..
1924 .	7	27	11	1	1	..	..	..	..	7	4	7	..	..	..	17	14	12	..	..	..
1925 .	9	19	11	3	2	11	..	..	..	8	..	10	3	..	17	13	9	9	..	..	..
1926 .	9	27	36	1	..	2	..	..	..	12	5	23	2	..	7	16	20	34	..	..	..
1927 .	8	5	7	2	8	18	..	..	..	6	1	22	3	1	4	23	16	20	..	..	..
1928 .	14	12	17	3	1	10	..	..	..	5	..	5	3	..	3	10	7	63	..	..	..
1929 .	6	21	4	1	1	..	..	..	..	2	1	1	1	..	1	6	11	13	1	3	..
TOTAL	87	165	127	12	16	56	1	1	..	55	33	116	26	3	52	100	106	179	1	3	..
AVERAGE	9	16	13	1	2	6	1	1	..	5	3	12	3	1	5	10	11	18	1	1	..

APPENDIX I.—concl'd.

Detailed statement showing the number of accidents and persons killed and injured during the ten years ending 1929—concl'd.

Year.	PETROLEUM.			CHEMICALS.			MISCELLANEOUS.		
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1920	22	7	14	1	1	8	...	...	...
1921	7	8	20	...	...	...	3	4	2
1922	10	8	2	...	...	...	2	2	4
1923	8	5	11	...	...	...	2	1	1
1924	8	6	8	2	3	5	1	8	...
1925	8	8	16	2	...	10	3	...	1
1926	6	6	18	...	...	...	3	...	8
1927	9	5	8	2	...	9	1	...	...
1928	9	61	20	1	...	3	2	2	1
1929	16	20	28	...	...	...	4	1	8
TOTAL	103	130	150	8	4	35	21	18	22
AVERAGE	10	14	15	1	1	3	2	1	2

APPENDIX J.

Comparative statement showing the number of accidents and persons killed and injured during the ten years ending 1929.

Year.	ACCIDENTS CAUSING LOSS OF LIFE OR BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	NUMBER OF PERSONS.			
		Killed.	Injured.		
1920	32	26	64	10	42
1921	27	32	61	2	29
1922	21	20	20	1	22
1923	39	69	69	5	44
1924	40	58	43	3	43
1925	45	38	84	4	49
1926	40	57	128	...	49
1927	49	36	88	5	54
1928	46	83	128	1	47
1929	37	64	52	4	41
TOTAL	385	483	737	35	420
AVERAGE	38	48	74	3	42

APPENDIX K.

Letter No. G-4 (178), dated the 23th March 1929, from the Officiating Chief Inspector of Explosives in India, Calcutta, to the Revenue Secretary to Government, Punjab, Lahore.

SUBJECT :—EXPLOSION AT THE BLASTING POWDER FACTORY AT KHEWRA.

As a result of your telegram No. 5768-R, dated 13th February 1929, intimating that the Punjab Government would like me to investigate and report on the explosion which occurred at a blasting powder factory at Khewra on the 8th of February, I have the honour to report that I arrived at Khewra on March 6th.

2. I was met by the Deputy Commissioner, Jhelum, the Sub-Divisional Magistrate, Pind Dadan Khan, who had conducted the magisterial enquiry required by Section 9(1) of the Indian Explosives Act, and the General Manager, Salt Range Division, Khewra. In the company of the above officials I visited the scene of explosion.

3. A copy of the final report of the Sub-Divisional Magistrate, Pind Dadan Khan, which was forwarded to this office is attached.

4. The existence of a factory for the manufacture of blasting powder at Khewra was not known to this Department, although it had been in existence for a considerable time, and although two accidents of a similar nature had occurred in factories on the same site at Khewra in the past, one in 1916 and the other earlier. As far as I could make out the reports concerning these accidents did not go beyond the Northern India Salt Revenue Department.

5. The conditions under which blasting powder was being manufactured at Khewra at the time of the accident can only be described as scandalous. To my mind it is beyond belief that such a place could have existed with the knowledge of and for the use of the Salt Department, and with the knowledge of the District Authorities. For years large quantities of gunpowder have been manufactured by contractors in a so-called factory without any proper control over the factory being exercised by any one in authority. It has never been realised by the District Authorities that the factory was not a Government one and therefore that the contractors should have been in possession of proper licenses taken out under the Indian Explosives Rules for manufacture and possession.

6. The state of affairs, from the point of view of control, existing at the time of the accident may be gauged from the following :—

- (a) The Salt Department had been in the habit of placing a contract each year for the manufacture of gunpowder and flares to meet the requirements of the Salt Mines.
- (b) For the last six years the contract had been held jointly by the three contractors who possessed it at the time of the accident.
- (c) The contractors under the terms of the contract were provided by the Salt Department with buildings in which to manufacture and to store their output, and a water supply. They and their labourers were also supplied with dwelling quarters.

- (d) The Salt Department yearly obtained for their contractors from the District Authorities some kind of permit or certificate which authorised them to manufacture gunpowder to the Salt Department's requirements at the mines. As far as I could make out, no quantities were ever stipulated. At the time of the accident the three contractors were working under some such permit.
- (e) The contractors possessed no proper licenses to manufacture or possess gunpowder.
- (f) The contractors were in possession of a transport license of some sort issued by the District Authorities. How this was obtained I do not know. Not being in possession of form J licenses they were not entitled to it.
- (g) Each contractor was in possession of a license in Form D of the Explosives Rules issued to them by the District Authorities. In spite of the fact that such a license covers the manufacture, possession and sale, or the possession and sale, or the possession only of fireworks and their ingredients each of the licenses in Form D issued to the contractors was for the manufacture, possession and sale of Gunpowder and Fireworks, the maximum amount allowed to be manufactured, possessed or sold during a year being limited to 75 lbs. of gunpowder and 50 lbs. of fireworks.

7. Considering the amount of gunpowder that was being manufactured in the factory and the amount that was being stored at any one time (over 100 mds. at the time of the accident) the contractors in their joint names should have been in possession of—

- (a) A special license to manufacture granted under Article 10 of Schedule II of the Indian Explosives Rules. A license under this article is granted by the Governor-General in Council and is restricted in scope to manufacture only. No definite procedure is laid down in the Explosives Rules for obtaining this license. The procedure that I consider should be adopted is given briefly at the end of this report.
- (b) A license in Form J to cover possession and sale.
- (c) A general transport license in Form No. 2 (article 3 of Schedule (II)). Had they been in possession of licenses (a) and (b) above, the accident might not have occurred, at any rate it would not have proved so disastrous.

8. As has already been pointed out each of the contractors possessed a license in Form D. Having issued such licenses it was the duty of the District Authorities to see that the licensees complied with the conditions endorsed on the license form. They could not possibly ever have done so in these particular cases.

The accident was due primarily to a grinding mill running hot when ingredients for flares (classed as fireworks) were being ground and mixed. A responsible District Official could not possibly have approved of the place where the flares were being manufactured as is required by condition 4 of the license form, which reads as under:—

“Fireworks should be manufactured in such place only as may be a1-

proved by the District Magistrate, due regard being had to the public safety."

Furthermore to issue 3 licenses for the same premises is absolutely wrong. I cannot emphasise too strongly the importance of systematic and thorough inspection by District Authorities and Police of all premises licensed under the Indian Explosives Rules.

9. The type of Chakki or grinding mill used in the factory is common to the whole of the Punjab. It is a crude piece of plant but serves its purpose provided its spindle and spindle point with its seating are properly lubricated. (Failure to lubricate the bearings of a modern powder mill would also mean disaster).

The fire which caused the accident originated in the grinding room. Failure to properly lubricate the spindle of a Chakki in which an inflammable mixture used for making flares for mine inspection work was being ground, caused the mixture in the Chakki to ignite. In the room at the time there appears to have been about 50 lbs. to 60 lbs. of the finished mixture which at once caught fire and exploded. In an open space there were spread out to dry about 10 maunds of gunpowder. Powder when laid out for sun drying in this way is in rectangles about 5 ft. long by 3 ft. wide by about 1" to 2" thick. A good deal of this powder must have been almost dry. As a result of the fire and explosion in the grinding room it caught fire. The flames were carried to the large stock of gunpowder in the magazine which in its turn caught fire and exploded.

For further details of how the accident occurred, and its results I would refer you to the Sub-Divisional Magistrate's report. A glance at the plan of the factory shows the appalling conditions under which large quantities of gunpowder were manufactured and stored. Under the contract the Salt Department had to provide dwellings for the contractors and labourers of the factory. The dwellings they provided formed part of the same building as a magazine containing more often than not over 100 maunds of gunpowder. In these dwellings cooking took place. How such conditions have been overlooked for years I fail to understand, and how similar accidents have not been of very frequent occurrence during past years is a mystery. The saltpetre, sulphur and charcoal were stored in the same rooms whereas they should have been stored separately. From what I could judge the men with whom the contract was placed were not of a sufficiently responsible type to be entrusted with a contract involving the manufacture of such large quantities of gunpowder.

10. At the time of the accident there appears to have been not less than 100 maunds (8,000 lbs.) of gunpowder in the magazine. If a license in Form J had been applied for under Rules 38 to 48 of the Explosives Rules, the distances that the magazine would have had to observe from other buildings and works are as shown in the attached Form H.

11. If the contractors had been in possession of a Special License issued under Article 10 of Schedule II, the design and layout of the factory would have had the approval of this Department. Under such approval residential quarters of those connected with the factory would have had to be placed at least 100 yards from the factory. The shed in which the grinding and mixing took place would have been at a specified distance from the pestling and granulating shed. The site of the drying ground would have been fixed and so on.

12. As has already been pointed out, no definite procedure is laid down in the Explosives Rules showing how applications to manufacture gunpowder on a large scale should be dealt with. The procedure that I consider should be followed is briefly given below:—

- (a) An applicant for a Special License shall submit his application to the Local Government through the District Magistrate concerned.
- (b) His application should be accompanied by:—
 - (1) A site plan of the proposed factory showing the distances between buildings forming part of the factory, and the nature of the operations to be carried out in each.
 - (2) Construction plans of each building with particulars of construction.
 - (3) A statement giving the distances that the factory as a whole can maintain from any other buildings or works not forming part of the factory.
- (c) He shall also state:—
 - (1) The maximum quantity of gunpowder to be manufactured during the period for which the license is granted.
 - (2) The maximum amount that he wishes to possess at any one time in the factory as a whole.
 - (3) The number of persons to be employed at any time in each building.
 - (4) Whether the ingredients for the manufacture of the gunpowder will be stored separately.

The application should then be forwarded through this office to the Local Government. The Chief Inspector of Explosives, if he recommends the grant of the license, will pass it on to the Local Government with his recommendation stating in detail under what terms and conditions the license should be granted.

13. I would recommend:—

- (a) that what remains of the old factory, residential quarters, etc., be demolished forthwith. As the buildings belong to the Northern India Salt Revenue Department the demolition should be carried out under the direction of a responsible official of that Department. The site of the factory together with what remains in the way of buildings should be thoroughly deluged with water before demolition begins;
- (b) that the site of the old factory should not be used as a site for a new factory. A more suitable site exists south of it;
- (c) that unless a more responsible type of individual can be obtained to undertake the manufacture of gunpowder at Khewra to meet the requirements of the Salt Mines, the Salt Department should manufacture for themselves. In both cases the procedure detailed under my paragraph 12 above, where applicable, should be followed.

APPENDIX L.

Letter No. G-5 (69), dated the 2nd March 1929, from the Officiating Chief Inspector of Explosives in India, Calcutta, to the Secretary to the Government of Burma, Judicial Department, Rangoon.

SUBJECT:—CRUDE OIL FLAT FIRE ON 6TH FEBRUARY 1929 AT THILAWA.

As a result of your telegram No. V-29, dated 13th February 1929, intimating that the Local Government required my services in connection with the Oil Flat fire which occurred at Thilawa on the morning of the 6th of February, I have the honour to state that I arrived at Rangoon on the 19th February. On arrival I was served with a summons to appear as a witness on the following day at the Court of the Eastern-Sub-Divisional Magistrate, Rangoon. From a perusal of the papers shown me by the Magistrate, I found that the Local Government wished me to assist the Sub-Divisional Magistrate in holding an inquest into the deaths of the men who lost their lives as a result of the fire. This I did.

Before attending the inquest I went down to Thilawa and viewed the scene of the fire. While at Thilawa I had a discussion on what had occurred with the Manager of the British Burma Petroleum Company's Refinery there. As an empty flat of exactly the same design as those involved in the fire was at the Company's Jetty, I took the opportunity of going on Board and inspecting it.

On returning to Rangoon I visited the offices of the Irrawaddy Flotilla Company, Limited, and requested them to let me have a blue print of a plan of one of their Oil Flats. This has just come to hand. All Crude Oil Flats belonging to the Company are of the same design. I propose to examine the plan and report in due course on the design. An urgent call from the Punjab Government prevents me from reporting in this connection at once.

* A perusal of the evidence given by me at the Inquest will show what I consider to have been the cause of the fire.

I recommend that a new site should be fixed upon at once for the mooring buoys for the Oil Flats containing Crude Oil for the British Burma Petroleum Company's Refinery at Thilawa. The new site should be fixed at least half a mile upstream away from the old site.

The precautions that the Oil Company take for guarding the Oil Flats after they have taken them over from the Irrawaddy Flotilla Company, Limited are satisfactory.

**Brief summary of my evidence after an examination of most of the witnesses produced.*

Four Oil flats were involved in the fire. As the oil could not have ignited spontaneously, I considered that the fire was caused by a naked light on one

or other of three of the flats. As the meals for the crews had been cooked ashore and happened to have been brought on board just before the accident, I considered that a member or members of the crew of one or other of three of the barges must have been smoking and the naked light must have been that of a match. I exempted from blame the crew of one barge. Vapour leaking from one of the compartments nearest to the Wheel House (crews' quarters) on one of the three flats was ignited, the flames being communicated to an explosive mixture of air and petroleum vapour in the compartment and exploding it. The result of such an explosion would be that the deck immediately above this compartment would be torn up and burning oil thrown all over the other barges, with the result that the oil in them would in turn catch fire. There was a succession of explosions as the fire extended, the burning oil on the barges acted in the same way as the naked light in the first instance.

Under Rule 10, Chapter II, Part II of the Burma Petroleum Rules no fire, naked lights or smoking shall be allowed on board any flat or barge carrying petroleum in bulk.

Letter No. G-5 (69), dated the 14th June 1929, from the Officiating Chief Inspector of Explosives in India, Calcutta, to the Secretary to the Government of Burma, Judicial Department, Rangoon.

SUBJECT:—CRUDE OIL FLAT FIRE ON 5TH FEBRUARY 1929 AT THILAWA.

In continuation of this office letter No. G-5 (19), dated the 2nd March 1929, and with reference to your letter No. 59-V—29, dated the 5th June 1929, I have the honour to report as under—

I have studied the design of oil flats used by the Irrawaddy Flotilla Company for the transport of crude oil and on the whole consider them quite suitable for that purpose.

I submit, however, the following suggestions for considerations:—

- (1) That the wood packing between the bitts and the steel deck be removed and the bitts be rivetted direct to the deck. I feel that in time there is a possible source of leakage at these points as the wood is often under considerable strain and must give slightly.
- (2) That the vents to the four hatches nearest to the Wheel House (the crews' quarters) be removed from their present positions and be fitted to the opposite sides of these hatches.

I consider that these vents are much too close to the entrance to the Wheel House in spite of the fact that they are fitted with double gauzes. My object in suggesting this change is only precautionary. I am convinced that the Regulations as far as they pertain to naked lights are often infringed.

- (3) That the flats be docked for thorough overhaul and inspection by the Company more often than at present. The time between two such dockings is at present 18 months. It might be worth while to reduce this period to 12 months.

APPENDIX M.

Letter No. G-5 (71), dated the 8th April 1929, from the Officiating Chief Inspector of Explosives in India, Calcutta, to the Chairman, the Commissioners for the Port of Calcutta, Calcutta.

SUBJECT:—OIL FIRE AT BUDGE BUDGE.

With reference to your letter No. 4449, dated the 20th March 1929, I have the honour to state that on the morning of the 28th March I proceeded to Budge Budge to enquire into the cause of the fire which occurred at No. 4 Oil Jetty on the 19th March. I was accompanied by Mr. H. M. Crocker, Officiating Dock Master and Mr. F. E. Waite of the Burmah Shell Oil Storage and Distributing Company of India, Limited. I questioned as many of those who were connected with the fire as could be got together on that date, and attempted at the scene of the fire to reconstruct what actually happened.

Before dealing with the evidence, most of which was absolutely unreliable I wish to explain the cycle of pumping operations which necessitated oil being pumped into the oil barge (No. 2 B.O.C.) lying at No. 4 Jetty.

At the time of the fire the oil tanker the S.S. Masimpur was lying alongside No. 8 Jetty and the S.S. Beme alongside No. 4 Jetty. During the night of the 18th/19th of March the S.S. Masimpur had completed pumping ashore her cargo of so-called "Inferior" (Red) Kerosene. Before she could proceed to pump her cargo of so-called "Superior" (white) kerosene, i.e., on the morning of the 19th of March the pipe line, which is ordinarily used for "Inferior" oil, had to be cleared and cleaned.

To do this the procedure given below was adopted:—

- (a) The line was broken and a flexible connected and laid down the river bank.
- (b) Water was pumped by the S.S. Masimpur through the line into the river for about 45 minutes.
- (c) Pumping was stopped and the "Inferior" oil line was connected up to the "Superior" oil line.

To clear the line between jetties Nos. 4 and 5 of any oil that might have been in it, two lengths of flexible were attached to the line on Jetty No. 4 and the end put into the hatchway of the oil barge lying at the Jetty. Water was then pumped through the line by the S.S. Masimpur. When there were no signs of oil in the water the end of the flexible was taken out of the hatchway and laid on the deck of the oil barge, and the water allowed to run into the river. After a short time instructions were given to the S.S. Masimpur to start pumping "Superior" oil. On the first signs of oil appearing, according to Mr. Dawes, an Assistant at the Installation of the Burmah Shell Oil Storage and Distributing Company of India, Limited, who

was in charge, the end of the flexible was put back into the hatchway. Whether this was done is doubtful. From what I could gather and surmise as a result of my enquiry I should say this was not done.

It was at this juncture or shortly afterwards that the accident occurred.

If nothing had happened, pumping into the barge would have continued until a sample of the oil, taken from the end of the flexible showed it to be free from water.

As far as I can make out, before pumping into the barge began, there were alongside the oil barge at No. 4 Jetty either one or two "Heave-up" boats and then beyond it or them No. 20 Hawser Boat.

No. 20 Hawser Boat appears to have been tied to the cradle pontoon nearest the bank as well as to the "Heave-up" boat it was alongside.

Seeing the Manji of the nearest "Heave-up" boat smoking, Mr. Dawes states he ordered the "Heave-up" boats away from the barge.

Whatever the positions of the boats were before the accident is really of little consequence. There can be no doubt that when the fire occurred No. 20 Hawser Boat was alongside the oil barge and the "Heave-up" boat or boats were astern of her.

Dawes was the Assistant in charge of the pumping operations at the time and was actually on the barge when the first fire occurred. He is very emphatic in his declaration that he noticed a small fire (for cooking purposes) in the stern of No. 20 Hawser Boat when she came alongside the oil barge. According to him the Hawser Boat came in such violent contact with the oil barge that the end of the flexible lifted from the hatchway and a certain quantity of the mixture of oil and water that was being pumped was spilt on to the deck of the barge and flowed into the Hawser Boat and into the river. I am prepared to believe, and in fact I feel certain, that there was a fire in the Hawser Boat and that this fire was responsible for the oil igniting, but I am not prepared to believe that a small Hawser Boat like No. 20 could collide so violently, under the conditions prevailing at the time, with an oil barge of the size of the one in question that the end of a heavy 6" flexible would be lifted above the hatchway to allow of the oil flowing over the deck of the barge. He states further, that he saw the Hawser Boat coming alongside and, noticing the fire in the stern, ordered it away. When the fire did occur I must say he acted promptly and efficiently in rushing off the barge to the valve and closing it. He then proceeded with help to disconnect the flexible from the pipe line. The oil remaining in the flexible (about 50 gallons) he states flowed on to the pontoon. This oil later on caught fire. An attempt was made by those on the spot to get the burning oil barge and Hawser Boat away from the pontoon. I enclose a copy of a report on the whole occurrence submitted by the Manager of the Installation of the Burmah Shell Oil Storage and Distributing Company of India, Limited. It may be noted that in the Report No. 20 Hawser Boat is referred to as a "Heave-up" Boat.

I am convinced that what actually happened is as is described in the report of the Dock Master contained in letter No. 149, dated the 20th March 1929 from the Harbour Master to the Deputy Conservator of the Port.

After instructions had been given to the S.S. Masimpur to commence pumping "Superior" oil I do not think that sufficient supervision was exercised over the discharge from the flexible, and that before the individuals on the barge realised what was happening oil was being discharged from the flexible on to the deck of the barge, and that the end of the flexible was not put into the hatchway before the fire occurred. It is of interest to note that the oil in the compartments of the barge did not catch fire. There can be no doubt that a certain amount of oil flowed from the deck of the barge into the Hawser Boat and into the river. A certain amount might even have flowed on to the pontoon alongside which the S.S. Beme was lying.

There can be no doubt that the second fire was due to the oil on the pontoon and probably that on the water alongside the S.S. Beme being ignited by the fire on the oil barge or the Hawser Boat. I do not consider for one moment that there was an explosion of any kind. If there had been an explosion it would have occurred in one of the compartments of the oil barge, and the barge would have shown some signs of it, which it does not. There is the probability of the oil having ignited with explosive violence, but that is quite another matter. Furthermore, Dawes, when questioned on the subject stated that there was no explosion. He of all people connected with the affair would have remembered it.

I examined thoroughly the pipe line arrangements from No. 8 Jetty to No. 4 Jetty. Although the S.S. Masimpur had discharged a cargo of petrol, there is no possibility whatsoever of petrol getting into the kerosene oil line involved in the accident. The so-called petrol smell reported was nothing more than a kerosene oil smell. The two are very difficult to distinguish at any time with certainty.

I have dealt very briefly with what happened. The witnesses I found hopelessly unreliable and I have had to more or less surmise what the actual state of affair was.

The accident has brought one important thing to light as far as I am concerned, and that is, that no proper facilities exist to control efficiently the pumping of oil from a ship to the shore at these particular Jetties. If Jetty No. 4 had been in telephonic communication with the ship at Jetty No. 8, as it should have been, the accident would not have occurred. To my mind it is essential that the moment the pumping turn-over from water to "Superior" oil took place at the steamer the man in charge at No. 4 Jetty should have known. Under the arrangements existing at the time he could not possibly have known within 5 to 10 minutes of the actual time. I have already suggested to the Burmah Shell Oil Storage and Distributing Company of India Limited that they should take the matter up forthwith and see what can be done. At the moment ships lying alongside Jetties Nos. 4 and 8 can be put in telephonic connection with the Installation Office but no more. What happens at night, as far as control is concerned, when pumping is going on I do not know.

I have the matter in hand and shall see that a suitable telephonic system is installed. I shall look into the matter as far as it concerns the other Oil Companies at Budge Budge as well.

Furthermore, I find that the Company has no instructions in writing controlling operations at the Oil Jetties. I feel these are necessary and have informed the Company accordingly.

APPENDIX N.

Letter No. G-5 (72), dated the 1st May 1929, from the Officiating Chief Inspector of Explosives in India, Calcutta, to the Deputy Commissioner, Hanthawaddy.

SUBJECT:—FIRE AND EXPLOSION AT BENCH "C" OF THE BURMAH OIL CO., LD., REFINERY AT SYRIAM.

With reference to your Judicial Department letter No. 2353-C.M.—14 of 1929, dated the 29th of April 1929, I have the honour to return herewith your proceedings C.M. No. 14 of 1929 relating to your enquiry into the above occurrence together with certain drawings and photographs handed to me therewith.

In the company of yourself and Mr. H. L. Allan, Works Manager of the B. O. C. Refinery, I visited and inspected the scene of the disaster.

No better reconstruction of what probably occurred could be given than that contained in exhibit C,—the report of the Works Manager to the Refineries Department of the Burmah Oil Company, Limited. The accident, to my mind, was due to one or other of the causes detailed therein. A copy of this report together with two copies of Drawing No. 3146 (exhibit A) may kindly be obtained for me.

As a result of a long discussion with the Works Manager of the Refinery it has been arranged that—

- (1) the B. S. or drainage tank to each Bench will be placed in the open under a shelter;
- (2) the drainage valves from the forewarmers will be at the B. S. tanks outside;
- (3) drainage valves on Preheaters and forewarmers will be locked to prevent unauthorised opening. (The keys will be kept in a glass fronted cupboard in or near the Preheater House at each Bench);
- (4) firewalls will be inserted between Boilers and/or Superheaters and Benches. Such may be the end wall of the Bench, but it will have no openings such as doors, windows and/or pipe outlets or the like. It must be within its dimensions a complete screen. If pipes pass through it, they must be at least two feet above ground, the perforations in the wall being closed by steel plates on both sides and the space between each two plates packed with asbestos;
- (5) all sumps will be tested by filling with water before a Bench is commissioned after a shut down for overhaul, or when first put into use (the object being to find any unauthorised outlets). This arrangement will be made applicable to all Departments of the Refinery;
- (6) all nullahs pertaining to Boiler and Steam Superheater Departments will be completely isolated from general nullahs and in particular *Still* nullahs.

When the above have been carried out, accidents of a similar nature to that which occurred at Bench "C" should not be possible. The new Firing

Platform which is under construction for Bench "C" will be more open underneath than was the case with the old one.

On the other units the space underneath the Firing Platforms has been opened up in spite of the fact that the arrangement of the drainage tanks at these Benches could not have given rise to an accident such as occurred at Bench "C."

In view of what has been arranged there appears to be no necessity for me to remark on paragraphs 18 to 21 of the report of the Chief Inspector of Factories.

With reference to the portion of Mr. Miler's evidence which you have sidelined, I would remark as under :—

In time past it has been the custom of the Oil Companies to submit plans for important extensions or new works in their Refineries to the Chief Inspector of Explosives for approval.

These plans have on occasions been of a detailed nature, but ordinarily are merely site plans. When submitted the plans are accompanied by a letter of explanation. These plans have been submitted and accepted for the purpose of showing the position of the extension or the new work in relation to the surrounding buildings. Constructional details have not been submitted or checked, nor do I see any necessity for this. In the ordinary way detailed drawings have been considered unnecessary. Whenever it has been considered necessary that they should be produced, they have been called for.

The second part of condition 1 on page 110 of the Burma Petroleum Manual (1928) has never to my knowledge been complied with. I see no necessity whatsoever for its provision. It would merely hinder.

I consider that condition 7 on page 111 of the Manual should be deleted. All drainage from a bench of stills should be properly drained off and firetrapped.

It should be noted that at least once a year the Refinery is inspected by the Chief Inspector of Explosives. All extensions and new works constructed since his last inspection receive his particular attention.

Letter No. G-5 (72), dated the 27th June 1929 from the Offg. Chief Inspector of Explosives in India, Calcutta, to the Secretary to the Government of Burma, Judicial Department, Maymyo.

SUBJECT:—FIRE AND EXPLOSION AT BENCH "C" OF THE BURMAH OIL CO., LTD., REFINERY AT SYRIAM.

In continuation of my telegram No. G-5 (72), dated 21st June 1929, I have the honour to suggest that condition 7 of the "Conditions to be attached to permission to refine petroleum in a Refinery with a daily average still capacity of over 1,000 gallons" given on page 111 of the Burma Petroleum Manual (1928 Edition) be cancelled and replaced by the following general condition :—

"Suitable arrangements should exist for the proper carrying off and fire-trapping of all drainage and/or possible leakage from a still or bench of stills."

APPENDIX I.

Letter No. G-7 (36), dated 11th March 1930, from the Chief Inspector of Explosives in India, Calcutta, to the Secretary to the Government of Burma, Judicial Department, Rangoon.

FIRES IN MATCH FACTORIES IN BURMA.

With reference to the correspondence resting with your Miscellaneous Department letter No. 202—V—29, dated the 20th February 1930, I have the honour to state that during my recent visit to Rangoon I inspected several Match Factories and to report as under :—

The two chief causes of these fires seem to be :—

- (a) Fires occurring during the filling of empty match boxes by hand,
- (b) By refuse match heading materials coming into contact with refuse striking surface materials.

Fires can never be stopped during the filling of empty match boxes by hand or even by machinery. I have inspected several match factories in Europe and boxes are continually firing but provision is made for this. Girls are generally employed in the job of filling match boxes and an empty area of floor about 8 feet wide is maintained behind each row of girls. When a box fires, the worker simply flicks it over her shoulder on to the floor behind her. Of course this is easy in Europe as the workers are seated at high tables and are not squatted on the floor as in Burma.

In Burma the workers are squatted on the floor with a pile of empty boxes, box covers and a rack of loose matches and a tray of filled boxes on each side and in front of her. She is so close to her neighbours on each side that she can almost touch them. When a box fires, there is nothing she can do with it. She is seated on the floor surrounded with extremely inflammable materials. These conditions would never be tolerated for a moment in a factory in Europe or America.

I suggest :—

- (1) That an empty space of floor area ten feet wide be maintained surrounding each group of twentyfive workers so that fire occurring in the materials being worked on by one group will not communicate itself to the materials being worked on by neighbouring groups. Lines might be painted on the floor to facilitate inspection.
- (2) That every worker be supplied with a receptacle like half a kerosene oil tin containing a layer of sand 3 inches deep into which she can throw a fired box. This tin should be kept just in front of the worker and must of course be kept clean of match materials.

- (3) The case of refuse materials from heading operation and box striking surface materials coming into contact has been dealt with by the Chief Inspector of Factories, Burma, in his notification to the Managers of Match Factories. I can only suggest that two separate burning grounds or burning pits be kept, one for each class of materials, and that notices be put up showing which ground is kept for which material.